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| 10/066,023      | 01/30/2002  | Allen K. Lam         | M-7577-2D US        | 4878             |

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EXAMINER

WILLIAMS, ALEXANDER O

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

2826

DATE MAILED: 08/09/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/066,023

Applicant(s)

LAM ET AL.

Examiner

Alexander O Williams

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 January 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 4-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 4-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

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Serial Number: 10/066023    Attorney's Docket #: M-7577-2D US

Filing Date: 1/30/02;

Applicant: Lam et al.

Examiner: Alexander Williams

Applicant's Pre-Amendment in Paper # 2, filed 1/30/02 has been acknowledged.

Claims 1 to 3 have been canceled.

The non-statutory double patenting rejection, whether of the obviousness-type or non-obviousness-type, is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent. *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); and *In re Goodman*, 29 USPQ2d 2010 (Fed. Cir. 1993).

A timely filed terminal disclaimer in compliance with 37 CAR 1.321(b) and © may be used to overcome an actual or provisional rejection based on a non-statutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CAR 1.78(d).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CAR 3.73(b).

Claims 4 to 12 are rejected under the judicially created doctrine of double patenting over claims 1 to 3 of U.S. Patent No. 6,256,200 B1 since the claims, if allowed, would improperly extend the "right to ex exclude" already granted in the patent.

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Claims 4 to 12 are provisionally rejected under the judicially created doctrine of double patenting over claims 1 to 3 of copending Application No. 09/898212. This is a provisional double patenting rejection since the conflicting claims have not yet been patented.

The subject matter claimed in the instant application is fully disclosed in the referenced copending application and would be covered by any patent granted on that copending application since the referenced copending application and the instant application are claiming common subject matter, as follows: A semiconductor package comprising: a semiconductor die having first and second principal surfaces; a heat sink attached to a first surface of the die; a lead attached to a second surface of the die, the lead extending over opposite edges of the die; and a nonconductive capsule encasing the die and at least a portion of the lead and the heat sink, opposite ends of the lead protruding from the capsule.

Furthermore, there is no apparent reason why applicant would be prevented from presenting claims corresponding to those of the instant application during prosecution of the application which matured into a patent. *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

The Examiner notes that over and above a "basic" obviousness-type double patenting situation wherein a comparison of the claims takes place, the case law detailed above makes it clear that in cases where Applicant has voluntarily filed a later application seeking claims which provide a different form of coverage for same general invention disclosed in a parent, an obviousness type double patenting rejection may automatically apply since the granting of the claims of the later filed application may automatically extend the patent term granted for the original patented claims on the same general invention.

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The disclosure is objected to because of the following informalities: Applicant's cross reference to related applications should be updated,

Appropriate correction is required.

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the plurality of holes that are in a second portion of the first surface of said heat sink that is adjacent to said die, in claim 10 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claims 10 to 12 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 10, it is unclear and confusing to what shows "the plurality of holes that are in a second portion of the first surface of said heat sink that is adjacent to said die." The first portion of the heat sink appears to have grooves or notches formed within the heat sink.

Any of claims 10 to 12 not specifically addressed above are rejected as being dependent on one or more of the claims which have been specifically objected to above.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:  
A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 4, 6, 8 and 9 are rejected under 35 U.S.C. § 102(b) as being anticipated by Wakefield. (U.S. Patent # 5,598,034).

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In claim 4, Wakefield (figures 1 to 8) specifically **figure 7** show a semiconductor package comprising: a semiconductor die 13 having first (**bottom of 13**) and second (**top of 13**) principal surfaces; a lead 20 attached to a second surface of the die; a heat sink 110 attached to a first surface of the die; and a nonconductive capsule 14 encasing the die and at least a portion of the lead and the heat sink, opposite ends of the lead protruding from the capsule, wherein said heat sink includes a rim 117 enclosed from the capsule.

In claim 6, Wakefield has a plurality of holes 126 formed in said rim (**extended portion of 10 in figure 6**).

In claim 8, Wakefield (figures 1 to 8) specifically **figure 6** show a semiconductor package comprising: a semiconductor die 13 having first (**top of 13**) and second (**bottom of 13**) principal surfaces; a lead 20 attached to a second surface of the die (**attached by 23**); a heat sink 10, at least a portion of a first surface of the heat sink being attached to the second principal surface of the die; and a nonconductive capsule 14 encasing the die and at least a portion of the lead and the heat sink, opposite ends of the lead protruding from the capsule, wherein a plurality of holes 126 are formed at the first surface of said heat sink.

In claim 9, Wakefield's plurality of holes **126** are located in a portion of the first surface of said heat sink **10** that is not adjacent to said die **13**.

Claims 4, 5 and 7 are rejected under 35 U.S.C. § 102(b) as being anticipated by Kato et al. (U.S. Patent # 4,924,351).

In claim 4, Kato et al. (figures 2 to 10) specifically **figure 8** show a semiconductor package comprising: a semiconductor die 4 having first (**top of 4**) and second (**bottom of 4**) principal surfaces; a lead 2 attached to a second surface of the die (**attached by 6 and 3a**); a heat sink 21,1 attached to a first surface of the die (**attached by 21 and 3b**); and a nonconductive capsule 3a,3b encasing the die and at least a portion of the lead and the heat sink, opposite ends of the lead protruding from the capsule,

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wherein said heat sink includes a rim (extended end side portion of 1,21) enclosed from the capsule.

In claim 5, Kato et al. has a notch (located on the bottom surface of the end rim of 21) located on an underside of said rim.

In claim 7, Kato et al.'s heat sink 1,21 comprises a second notch (7 located on the bottom surface of end rim of 21), said second notch being enclosed by said capsule 3b.

Claims 4, 6, 8 and 9 are rejected under 35 U.S.C. § 102(b) as being anticipated by Suzuya et al. (U.S. Patent # 5,753,969).

In claim 4, Suzuya et al. (figures 2 to 17) specifically **figure 3** show a semiconductor package comprising: a semiconductor die 1 having first (top of 1) and second (bottom of 1) principal surfaces; a lead 3,6,7 attached to a second surface of the die (attached by 11,81,83,8,82,2); a heat sink 5 attached to a first surface of the die (attached by 12); and a nonconductive capsule 2 encasing the die and at least a portion of the lead and the heat sink, opposite ends of the lead protruding from the capsule, wherein said heat sink includes a rim (end side portion of 5) enclosed from the capsule.

In claim 6, Suzuya et al. has a plurality of holes 9 formed in said rim.

In claim 8, Suzuya et al. (figures 2 to 17) specifically **figure 3** show a semiconductor package comprising: a semiconductor die 1 having first (top of 1) and second (bottom of 1) principal surfaces; a lead 3,6,7 attached to a second surface of the die (attached by 11,81,83,8,82,2); a heat sink 5, at least a portion of a first surface of the heat sink being attached to the second principal surface of the die (attached by 12); and a nonconductive capsule 2 encasing the die and at least a portion of the lead and the heat sink, opposite ends of the lead



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protruding from the capsule, wherein a plurality of holes 9 are formed at the first surface of said heat sink.

In claim 9, Suzuya et al.'s plurality of holes 9 are located in a portion of the first surface of said heat sink 5 that is not adjacent to said die 1.

Claims 10 to 12, **insofar as they can be understood**, are rejected under 35 U.S.C. § 103(a) as being unpatentable over Suzuya et al. (U.S. Patent # 5,753,969) in view of Kato et al. (U.S. Patent # 4,924,351).

Suzuyz et al. show the features of the claimed invention as detailed above, but fail to explicitly show the plurality of holes having a second portion of the first surface of said heat sink that is adjacent to said die.

Kato et al. is cited for showing recessed thermally conductive packages semiconductor devices. Specifically, Kato et al. (figures 2 to 10) specifically **figure 8** show a semiconductor package comprising: the heat sink 1,2 having the plurality of holes 7 having a second portion of the first surface of said heat sink that is adjacent to said die 4 for the purpose of increasing thermal dissipation characteristic without decreasing the dielectric breakdown.

Therefore, it would have been obvious to one of ordinary skill in the art to use Kato et al.'s holes under the die to modify Suzuya et al.'s holes for the purpose of increasing thermal dissipation characteristic without decreasing the dielectric breakdown.

The listed references are cited as of interest to this application, but not applied at this time.

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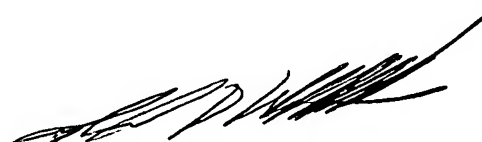
| Field of Search  | Date   |
|--|--------|
| U.S. Class and subclass:<br>257/666,669,674,668,675,676,690,692,693,696,698,712,<br>713,717,720,796,684,670,672<br>361/813,820,760,764,704,773<br>174/52.1,260,261,52.4                                  | 8/5/02 |
| Other Documentation:<br>foreign patents and literature in<br>257/666,669,674,668,675,676,690,692,693,696,698,712,<br>713,717,720,796,684,670,672<br>361/813,820,760,764,704,773<br>174/52.1,260,261,52.4 | 8/5/02 |
| Electronic data base(s):<br>U.S. Patents EAST  | 8/5/02 |

***Papers related to this application may be submitted to Technology Center 2800 by facsimile transmission. Papers should be faxed to Technology Center 2800 via the Technology Center 2800 Fax center located in Crystal Plaza 4-5B15. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Technology Center 2800 Fax Center number is (703) 308-7722 or 24. Only Papers related to Technology Center 2800 APPLICATIONS SHOULD BE FAXED to the GROUP 2800 FAX CENTER.***

Any inquiry concerning this communication or any earlier communication from the examiner should be directed to ***Examiner Alexander Williams*** whose telephone number is **(703) 308-4863**.

Any inquiry of a general nature or relating to the status of this application should be directed to the ***Technology Center 2800 receptionist*** whose telephone number is **(703) 308-0956**.

8/6/02



Primary Examiner  
Alexander O. Williams